

# Plant Size and Plant Function

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## Abstract

In any industry there is tremendous variation in plant size. Today, the standard approach in economics for accounting for these size differences is through heterogeneity in plant-level productivity. Those plants that are lucky enough to obtain high productivity draw expand production to exploit their good luck. This idea underlies a huge body of work in the profession.

This project expands the notion of within-industry heterogeneity beyond productivity to include variation in *function*. Small plants tend to do different things than large plants; in particular, they specialize in more custom work or retail-like activity. This kind of activity is often efficiently undertaken in small plants located close to the consumer. These plants often are classified in the same industry with larger plants, but they are doing different things. If we mistakenly attribute all variation in plant size to productivity differences, we are likely to draw erroneous conclusions in quantitative work.

A discussion of the Census industry “Automobile manufacturing,” (NAICS code 336111), makes the point clear. In the 1997 Economic Census there are 26 plants with over 1,000 employees, a size one might expect to find in a typical auto plant. But there are also 92 plants with one to four employees. What do these “auto plants” do? They make race cars, stretch limos, conversion vans, and other custom work that is obviously a different kind of activity than that performed by large plants. A researcher who attributes the difference in plant size between a thousand-employee auto plant and a three-employee auto plant to a difference in productivity is likely on the wrong track.

This paper uses micro data from the Census of Manufactures to quantify the role that variation in plant function plays in accounting for the size distribution of plants within narrowly defined industries. The project then uses the results to reevaluate representative examples of quantitative work that assumes the size distribution of plants is entirely driven by differences in productivities.

Specifically, we use data on product shipments in the micro data. For a selected set of industries, there is some particularly helpful information here. An example is the chocolate candy industry (NAICS 311330, Confectionery Manufacturing from Purchased Chocolate). It so happens that candy sold for retail produced in the same manufacturing establishment is classified as a different product than candy packaged for shipment to be sold outside the plant. We classify candy establishments with a large percent of sales in candy sold on location as primarily retail. We do an analogous thing for plants in several other industries including draperies and wood cabinets, where the product data singles out custom-made items.

We then do various quantitative exercises that others have done, first with the whole sample of candy manufacturers and then excluding those that are primarily retail, to see how the results change. For example, we redo empirical exercises like Bernard and Jensen (1995) where we will determine how export status varies with plant size.

The work on this project will begin in January 2006. All necessary Census clearances have been obtained and we are ready to begin. The opportunity to present a preliminary version of this work at the CAED Workshop in September 2006 would provide us with very valuable feedback at an early stage of the project.